

PASSING AI: ACHIEVING THE IMPOSSIBLE

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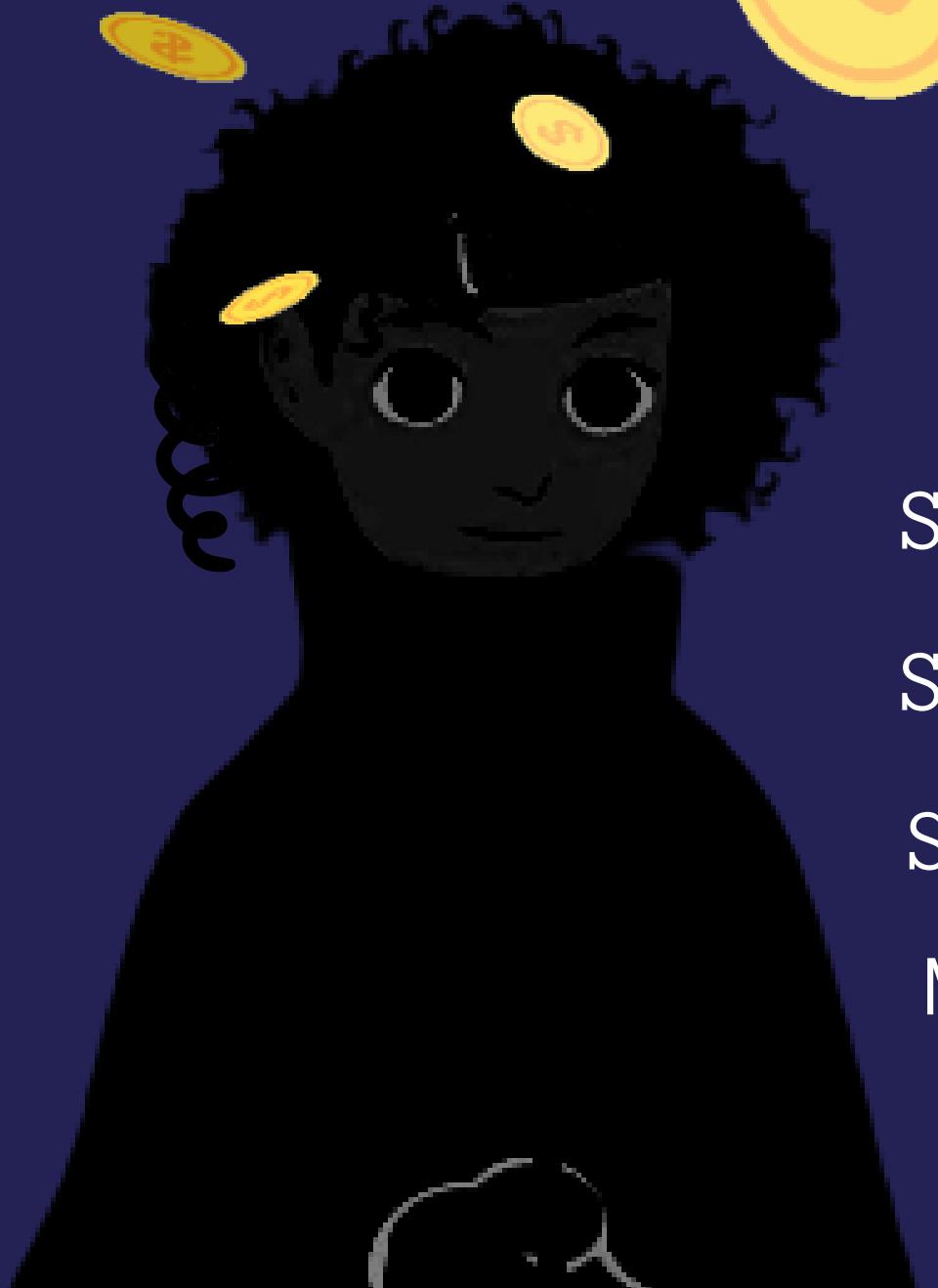
Choose your fighter



Student 0.00\$



Monika 420.69\$

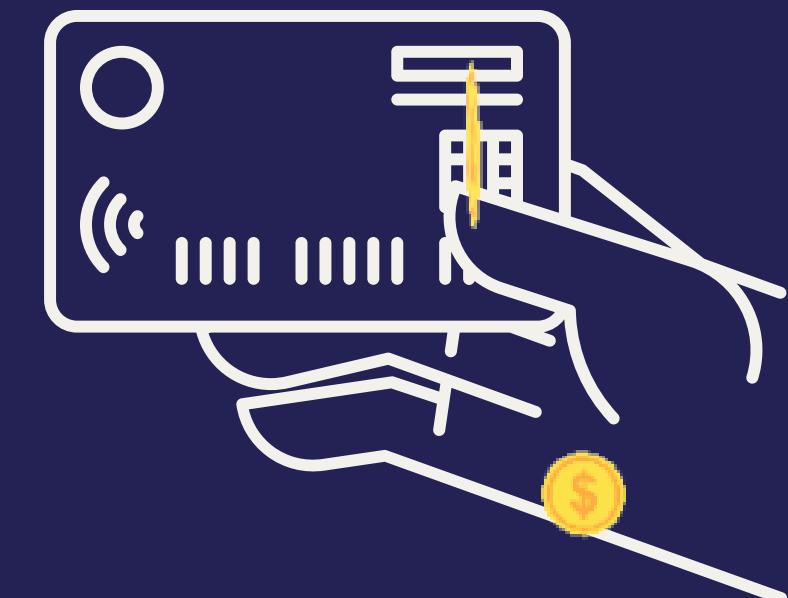


STR:  A horizontal progress bar with a purple circle at the start and a light purple gradient fill extending to the right.

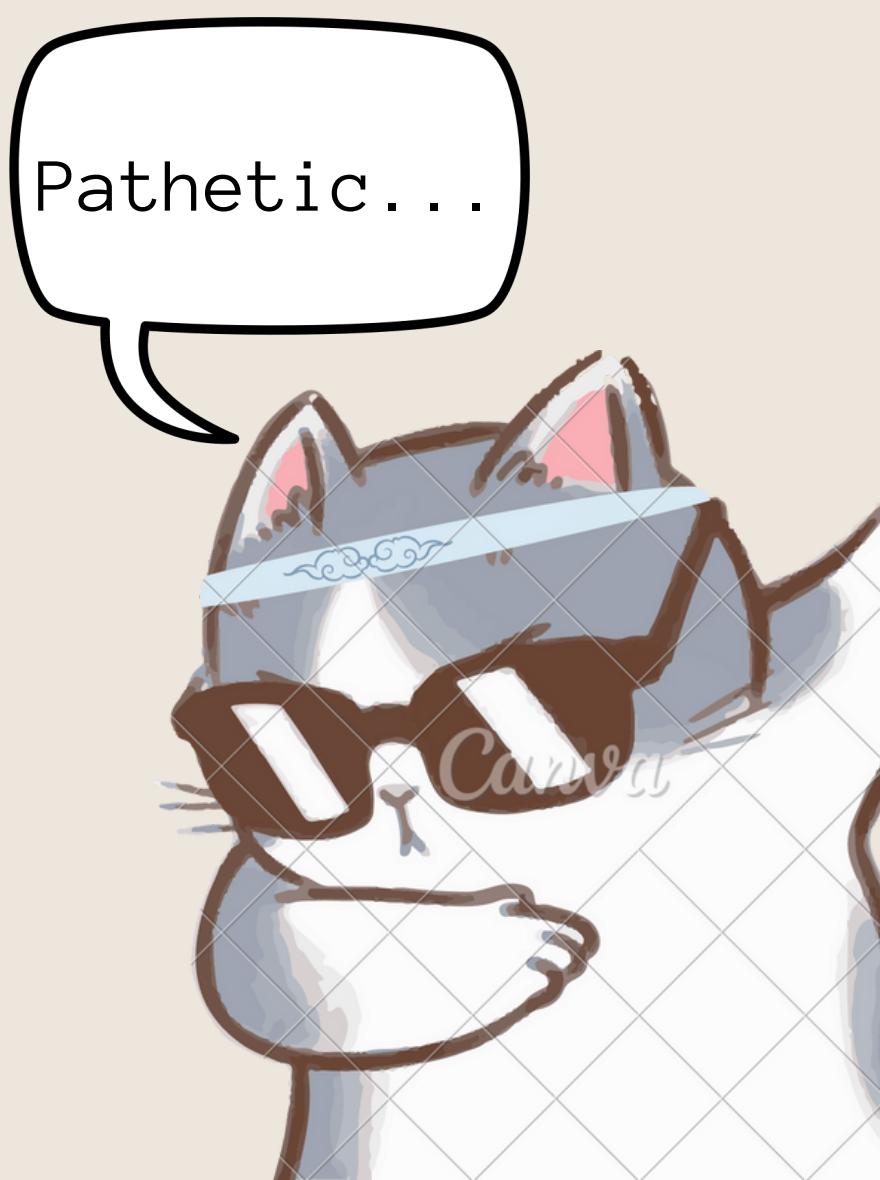
SPD:  A horizontal progress bar with a purple circle at the start and a light purple gradient fill extending to the right.

STM:  A horizontal progress bar with a purple circle at the start and a light purple gradient fill extending to the right.

MS:  A horizontal progress bar with a purple circle at the start and a light purple gradient fill extending to the right.



Premium Character



Monika

The Final Boss



Rules of the game

- There is only one PSS location on the board and it never changes. Squares adjacent to PSS have a strong coffee smell, squares whose horizontal or vertical distance from the PSS is equal to 2 have a weak coffee smell.
- There is only one party location on the board and it never changes. Squares adjacent to Party have a strong vodka smell, squares whose horizontal or vertical distance from the party is equal to 2 have a weak vodka smell. Attending a party will lead to an instant and horrible death (i.e. failing the course).
- At the end of the semester, the student passes the course if they have gained enough points. Otherwise, their fate becomes a horrible death.



Formal description

(0, 4)	(1, 4)	(2, 4)	(3, 4)	(4, 4)
(0, 3)	(1, 3)	(2, 3)	(3, 3)	(4, 3)
(0, 2)	(1, 2)	(2, 2)	(3, 2)	(4, 2)
(0, 1)	(1, 1)	(2, 1)	(3, 1)	(4, 1)
(0, 0)	(1, 0)	(2, 0)	(3, 0)	(4, 0)

Locations:

Bed → (0,0) Always known and the same

Study room → fixed for every student, unchangeable

PSS → fixed for every student, unchangeable, unknown

Party → fixed for every student, unchangeable, unknown

Actions:

Sleep → +2 point stamina

1 move → -1 point stamina

Study → -3 point stamina

PSS → -4 stamina

Score:

Study → +1 points score

PSS → +8 points score

Time:

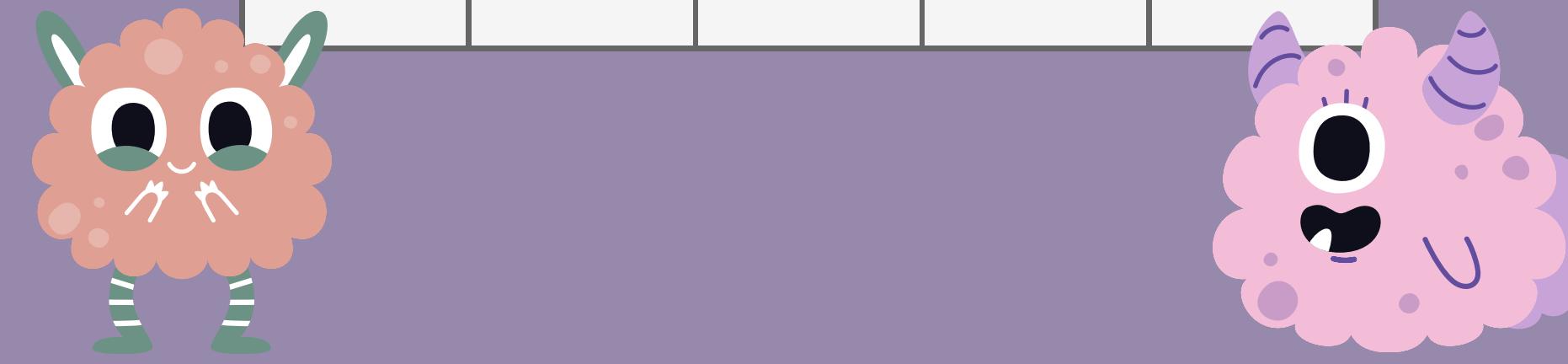
Sleep → +1 point time

Study → +1 point time

PSS → +1 point time

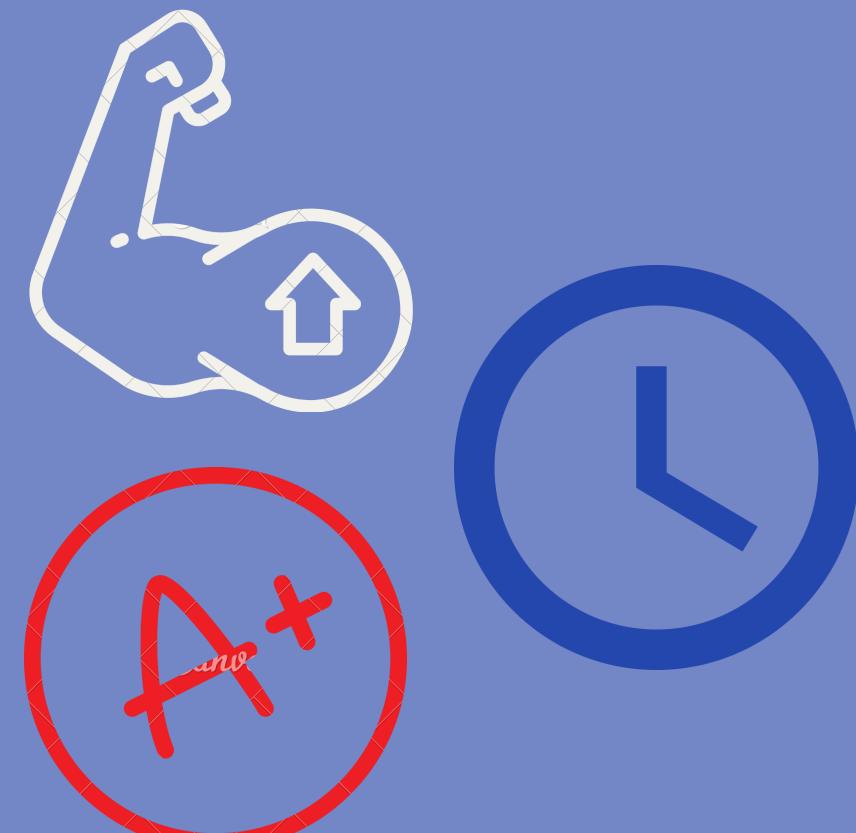
At the end student meets the final boss:

Monika



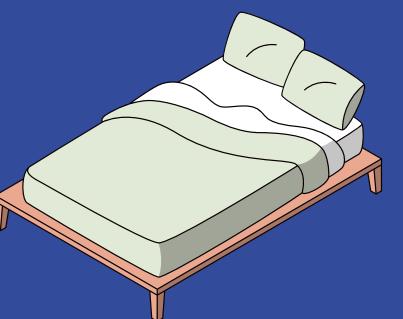
Peas Description

- Performance measure (stamina): walk -1, study -3, sleep +2, PSS -4
- Performance measure (time): walk +1, study +1, sleep +1, PSS +4
- Performance measure (grade): study +1, PSS +8
- Actuators: The player's limbs
- Sensors: The player's nose, eyes
- Actions: Walk up, Walk down, Walk right, Walk left, Sleep, Study, Attend PSS
- Percepts: Weak vodka smell, Strong vodka smell, Weak coffee smell, Strong coffee smell, current location, party, PSS, study room



Environment

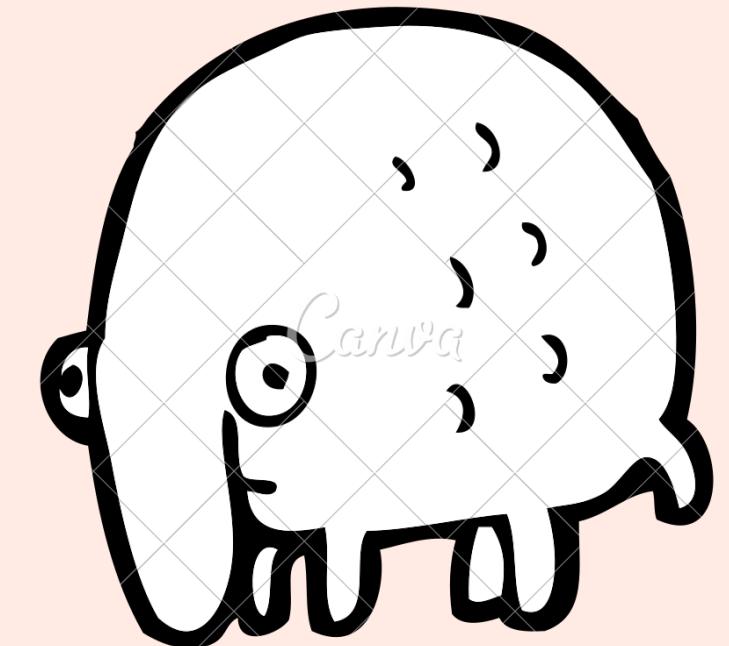
- Squares adjacent to Party have a strong vodka smell
- Squares horizontally or vertically adjacent to the squares that have a strong vodka smell have a weak vodka smell
- Squares adjacent to PSS have a strong coffee smell
- Squares horizontally or vertically adjacent to the squares that have a strong coffee smell have a weak coffee smell,
- Attend PSS iff you are in the PSS square
- Study iff you are in the Study Room square
- Death if you are in the same square as Party and $\{current\ grade / current\ time\} < 1/8$
- Sleep iff you are in the same square as Bed



World Characterization

- Partially observable – only local perception
- Deterministic – outcomes are exactly specified
- Static – the study room and PSS locations do not move
- Discrete – The board has a limited size, the applicable actions list is also limited.
- Single-agent – The only playable character is the Student.
- Known – The game rules are known to the agent.

This is Pablo we love him.



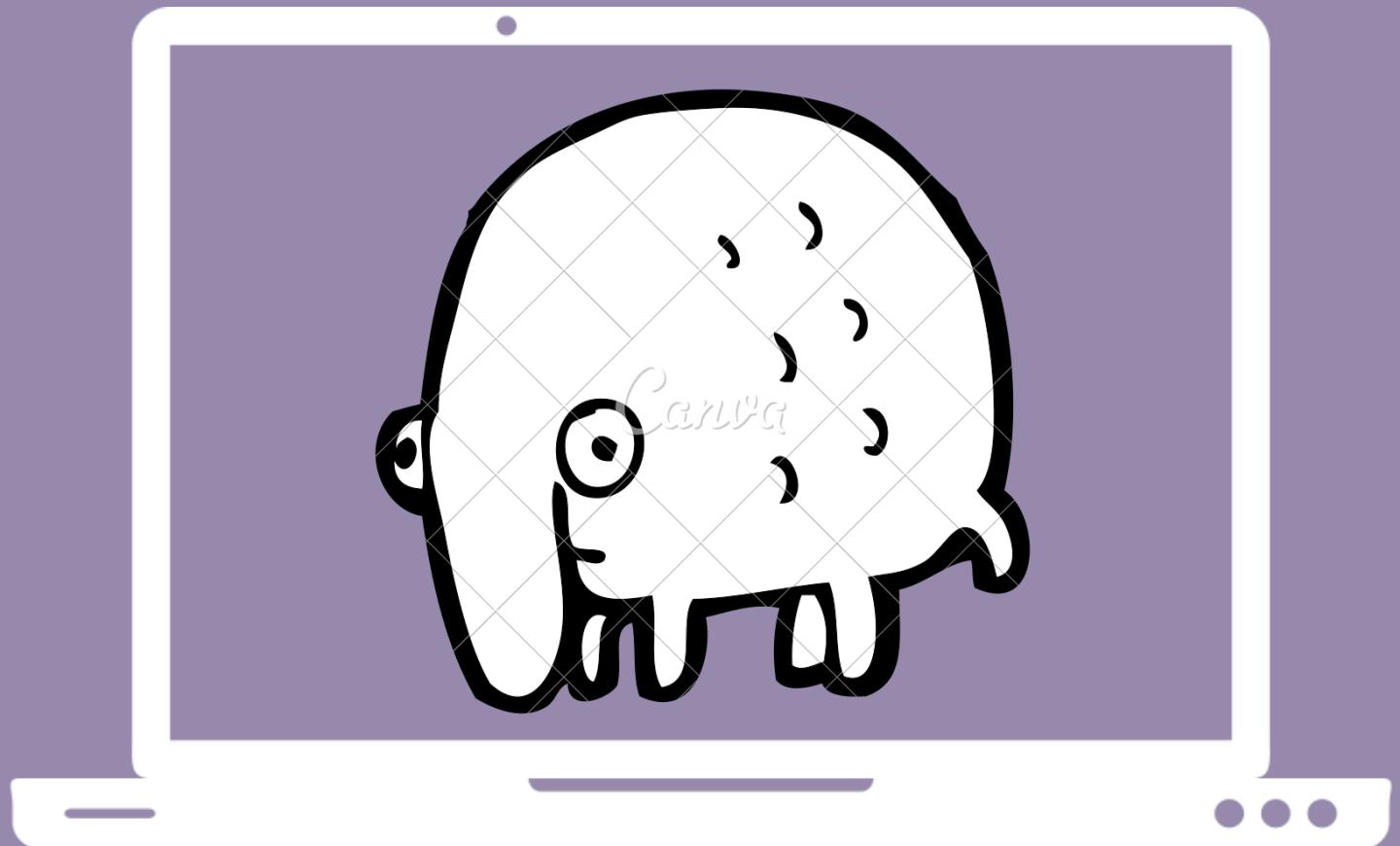
A SNePS Approach to The Wumpus World

Agent or Cassie Meets the Wumpus

- Using models that have a general human-level intelligence
- The knowledge base contains the beliefs of the agent as opposed to the information about the agent. The agent's decisions and actions are based on first-person beliefs.



General Logic



Yes, we love him a lot.

- on-line acting system
- mental actions – believe and disbelieve
- derived information that may or may not be saved in the KB is referred to as a lemma

Results

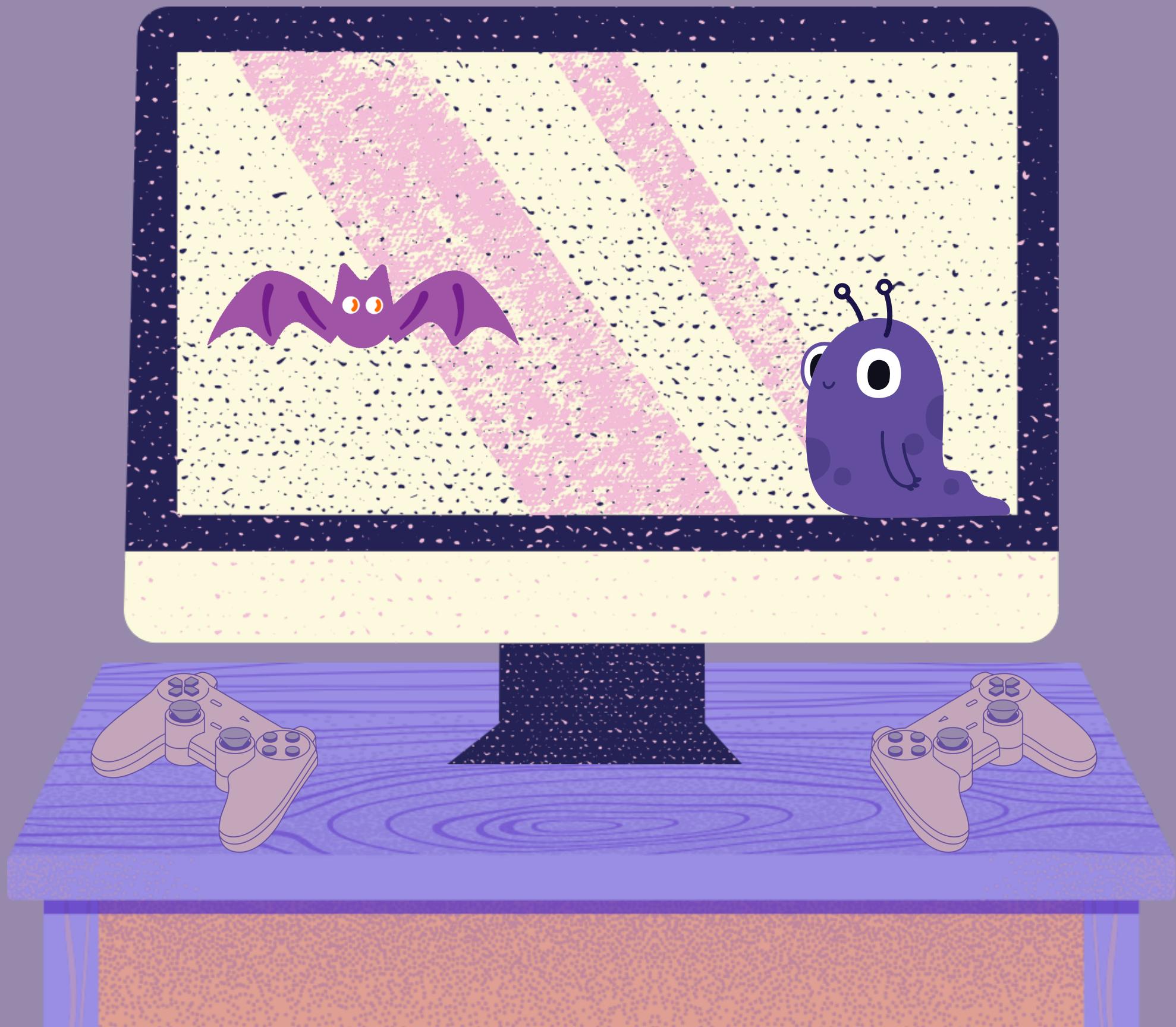
9 out of 10
games that
were
possible to
win without
taking
risky
actions
were won



2 out of 10
games that
were
possible to
win with
the use of
risky
actions
were won

Hunt the Wumpus: an Empirical Approach

- EM (relies on observation rather than theory) approach is based on probability with the help of Evaluator of Definite Notations
- There are texts that appear on the labels that display the made inferences
- Here lies the idea of “Definitive programming”
- This implies that the user may perform unscripted actions

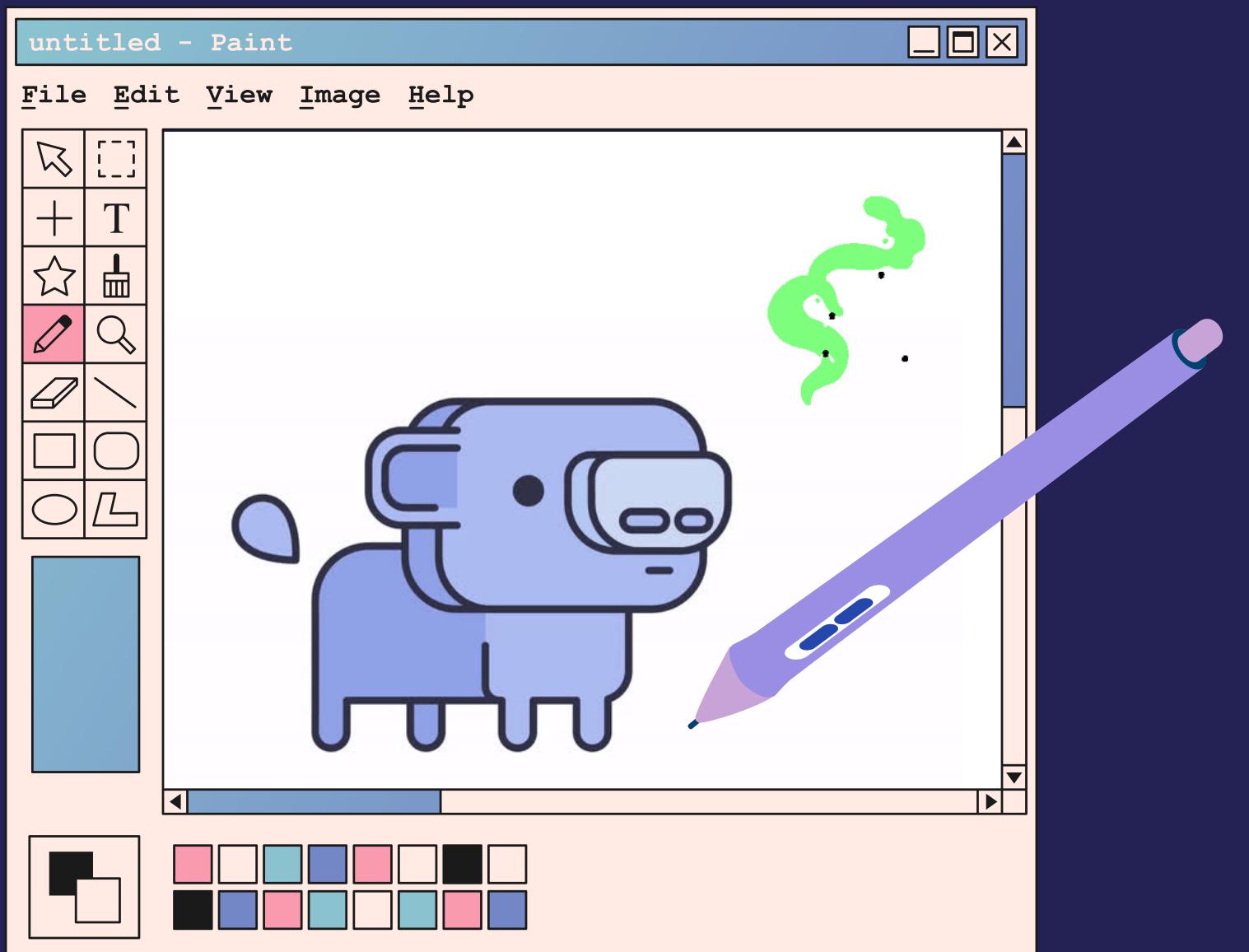


Strategies, rules, and the outcomes



- **First strategy:** Playing safely
The outcome: Eventually the player has to make a risk
- **Second strategy:** Removing the map
The outcome: the player must make harder inferences and create a map on their own
- **Third strategy:** Removing both map and inferences
The outcome: the player must come up with their own inferences about the dangers and the map
- **Fourth strategy:** Making inferences fail, Wumpus causing an earthquake
The outcome: can give incorrect conclusions
- **Fifth strategy:** Moving Wumpus when player misses their shot
The outcome: renews the information about the possible locations of the Wumpus

Agents that reason logically/ Wumpus World



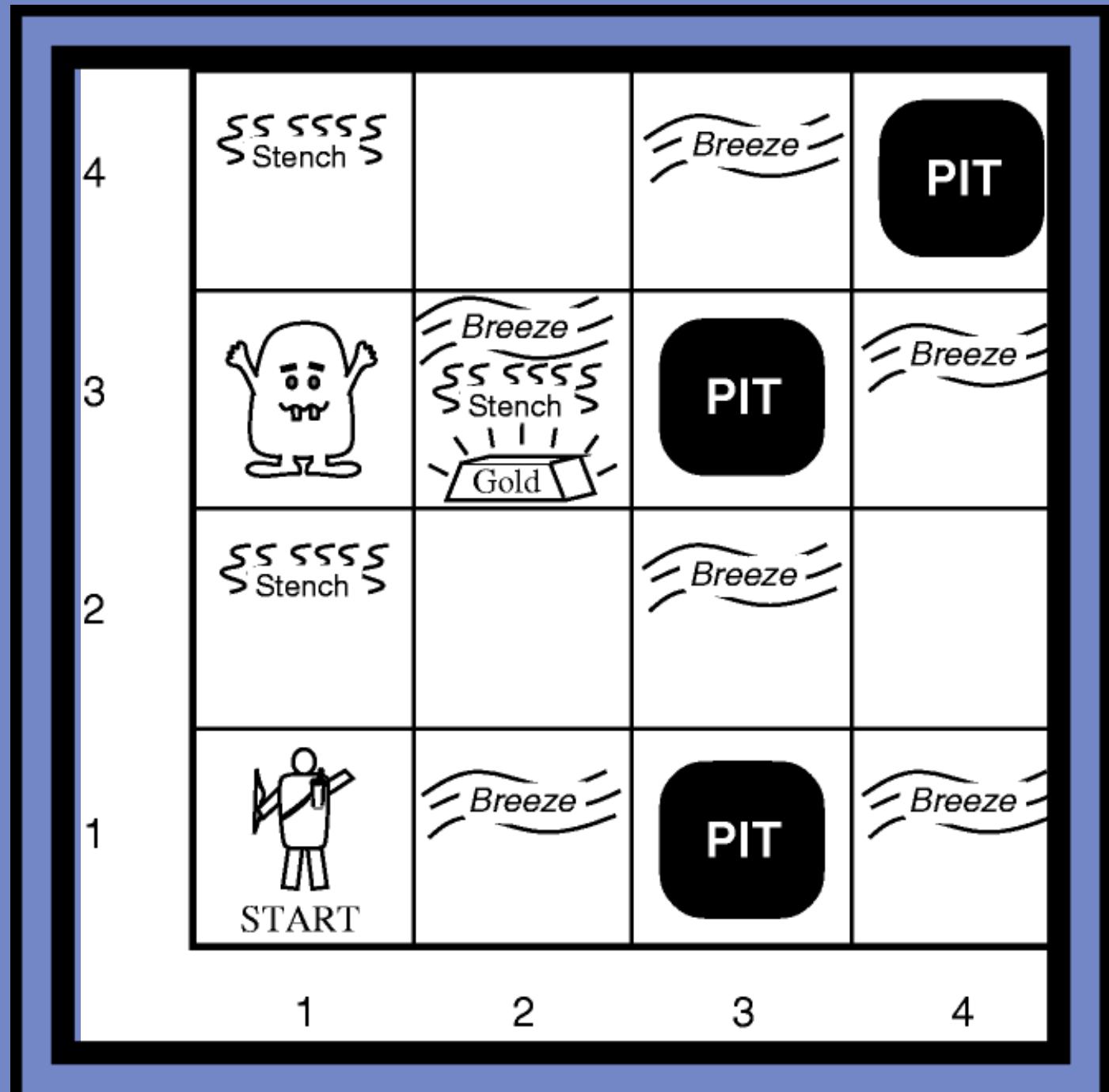
- The approach by Russel and Norvig
- The approach uses pure logic to find the solution to the problem by using the agent's perceptions, without adding any other approach to the problem
- The goal is to return to the initial cell successfully with the gold
- Each square other than the start location can be a pit, with probability 0.2

The results

- In most environments in this class, it is possible for the agent to return successfully with the gold
- In some the agent must choose between going home empty-handed or taking a chance that could lead to death or the gold
- In about 21% of the environments, there is no way the agent can get a positive score



- The author randomizes the world and in that particular example tries to see whether a solution is present
- He realizes that the solution is indeed present and finds the location of both the wumpus and the gold
- The author tries using propositional logic in order to find out whether they will come to the same solution as before
- They end up doing the same exact steps and come to the same conclusion
- Overall, we can conclude that using both logic and propositional logic we will eventually come to the solution if the agent doesn't have to take a risk or if the solution actually exists.



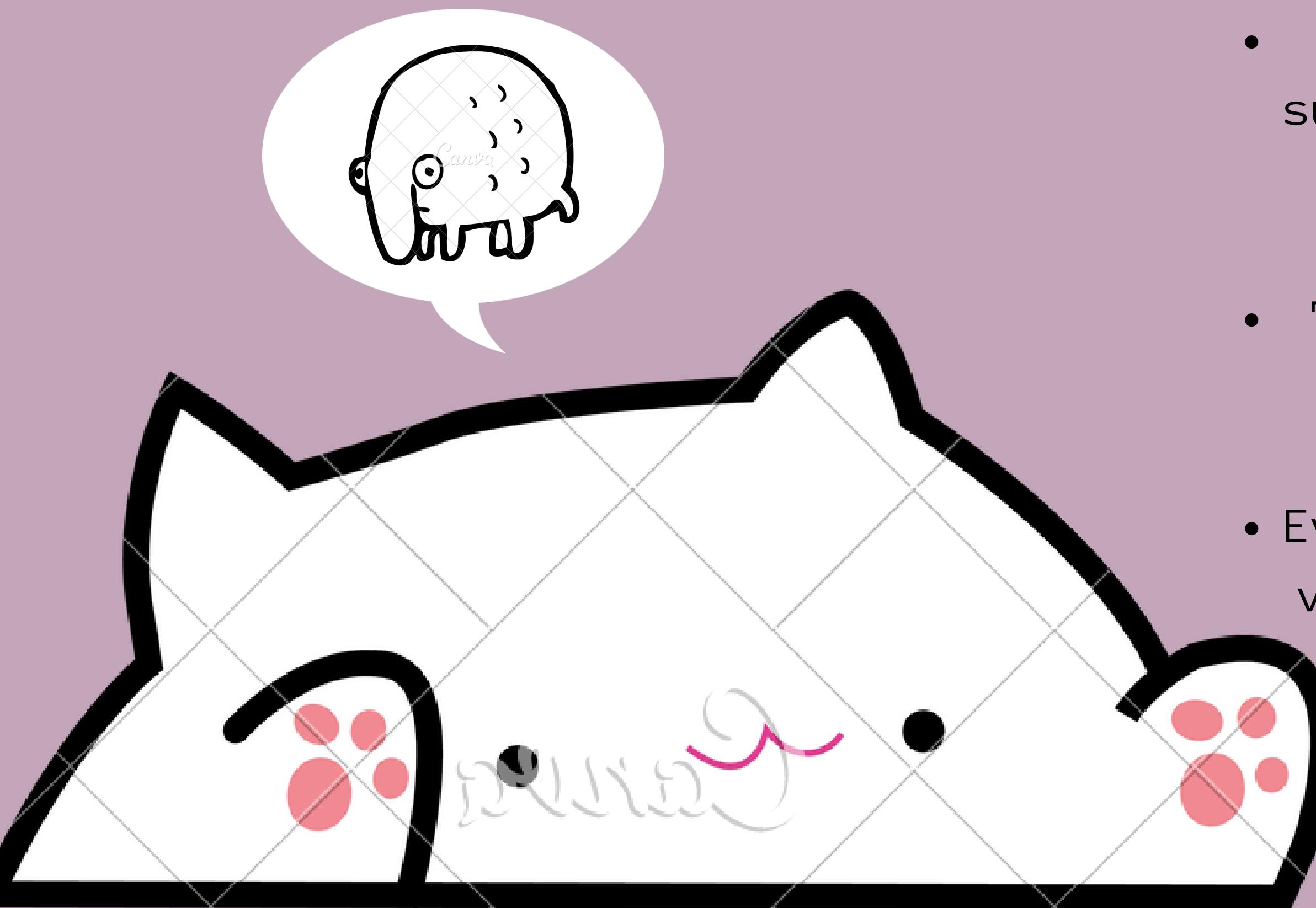
Our Progress

The simplest algorithm: Brute Force

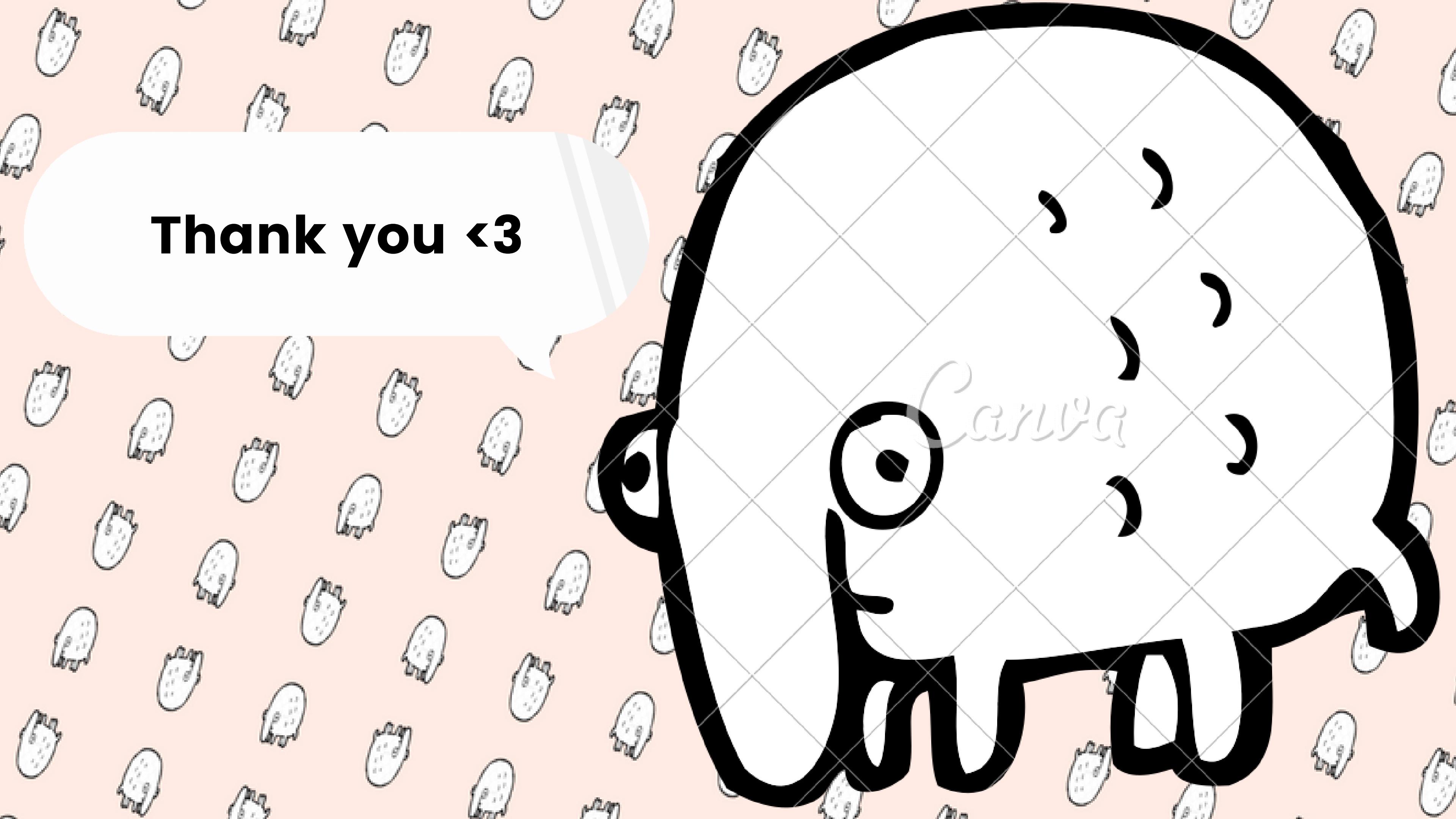
- Ignores all the percepts
- Moves towards the study room
- Hopes that it will not die on the way



The effectiveness of the algorithm



- When the algorithm succeeded the final grade was no lower than 80
- The algorithm succeeded in 60% of cases
- Even tho the algorithm is very simple it is a good reference measure



Carla

Thank you <3

References

- [1] Shapiro, S. C., & Kandefer, M. (2000). A SNePS Approach to The Wumpus World Agent or Cassie Meets the Wumpus. *cse.buffalo.edu*. Retrieved November 14, 2022, from <https://cse.buffalo.edu/~shapiro/Papers/shakan05a.pdf>
- [2] Hunt the Wumpus: an Empirical Approach. (n.d.). *warwick.ac.uk*. Retrieved November 14, 2022, from <https://warwick.ac.uk/fac/sci/dcs/research/em/publications/web-em/01/wumpus.pdf>
- [3] Agents that reason logically. (n.d.). *Massey.ac.nz*. Retrieved November 14, 2022, from <https://www.massey.ac.nz/%7Emjjohnso/notes/59302/l06.html>